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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

SEPTEMBER 9, 1933

Fleet as Mercury

See Page 172

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SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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DO YOU KNOW?

Sweet scented gladiolus blossoms are a new triumph for flower growers.

There are 82 miles of free exhibits at Chicago's Century of Progress Exposition.

To facilitate X-ray inspection of industrial materials, a portable X-ray machine has been devised.

The peculiar orchid known as Medusa's-head looks very much like a head with long disheveled hair.

Italy's program for conservation, reclamation, and utilization of soil and water resources is to be completed in 14 years.

Artificially propagated and nourished fish are as hardy and self-reliant as those reared in natural waters, says the Michigan State Department of Conservation.

After Government tests on 56 varieties of peaches, nine varieties were rated "excellent" for freezing.

The average length of an airplane ride taken by passengers on the scheduled air lines is 327 miles.

On Cape Breton Island, Nova Scotia, there are more than 13,000 people who use the Gaelic language as everyday speech.

A house made largely of copper, with copper "wall paper" and bronze furniture, is a trade exhibit at the Chicago Fair.

In providing some $3,000,000 for public works construction, the Czechoslovakian government requires that contractors use as few mechanical devices as possible in order to employ more workers.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY
Is the world's largest pyramid in Egypt? p. 165.
Did they have town planning in ancient Babylonia? p. 173.

ASTRONOMY
What new decoration is Saturn wearing? p. 169.

BIOCHEMISTRY
What can you learn about blood by whirling it? p. 164.

BIOLOGY
Does life check entropy? p. 163.

CHEMISTRY
How is ammoniated peat made? p. 169.
Where was vitamin C synthesized? p. 168.

ECOLOGY
How deep do our bur oak roots go? p. 168.
Plant Ecology—J. E. Weaver and F. E. Clements—McGraw-Hill, 1929, $5.

ENGINEERING
Are American automobiles needlessly heavy? p. 175.
In what new way can auto efficiency be tested? p. 170.

ETHNOLOGY
What are Elijah's melons? p. 163.
What peoples were beerless in 1492? p. 166.

ICHTHYOLOGY
How do sturgeons resemble sharks? p. 175.

MEDICINE
What have mothballs to do with eye disease? p. 174.

METALLURGY
Will pure copper corrode in acid? p. 171.

METEOROLOGY
When are hurricanes most frequent? p. 165.
Why the Weather?—Charles F. Brooks—Harcourt, Brace, 1924, $2.

NATURAL HISTORY
How do milkweed flowers catch insects? p. 170.

ORNITHOLOGY
Is the NRA emblem really an eagle? p. 171.
The Bird Book—Neltje Blanchan—Doubleday Doran, 1932, $5.

PALEONTOLOGY
Were all the saber-tooth cats big? p. 164.
A History of Land Mammals in the Western Hemisphere—William B. Scott—Macmillan 1924, $6.50.

PHYSICS
What are the chances against history repeating itself? p. 174.

PLANT PATHOLOGY
When will the crisis come in the white pine blister rust situation? p. 169.
Where did cocoa's worse diseases come from? p. 169.

PLANT PHYSIOLOGY
What good does acid do cotton seed? p. 169.

PSYCHOLOGY
How strong a social force is homesickness? p. 164.

PUBLIC HEALTH
How old are most of the St. Louis encephalitis victims? p. 163.

RADIO
What do magnetic storms do to radio? p. 170.

SEISMOLOGY
How quickly do earthquakes report themselves? p. 168.

VETERINARY MEDICINE
What animals are most liable to cancer? p. 168.
What mosquito carries horse encephalitis? p. 173.

VOLCANOLOGY
What national park gained a new steam fountain? p. 169.

ZOOLOGY
Where is the best range for pronghorn? p. 173.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

PUBLIC HEALTH

Present Sleeping Sickness Differs From Early Outbreaks

Rages in Summer Instead of Cool Weather, Attacks Older Persons Rather Than Young And Displays New Symptoms

THE ST. LOUIS sleeping sickness outbreak differs in several respects from those of past years. It came in high summer, whereas previous outbreaks occurred in winter or early spring. It is attacking middle-aged and old persons for the most part; in earlier epidemics the young have been the chief victims. Furthermore, the symptoms by which a physician may recognize the disease show some differences from those of previously recorded cases.

These points are brought out in detail in a statement which has been sent to all state, city and local health officers in the country by the U. S. Public Health Service. The statement, which was written by Dr. James P. Leake, who is senior representative of the Public Health Service in the afflicted St. Louis area, is in part as follows:

"From August 7 to 25, inclusive, there were reported in the metropolitan area of St. Louis 213 cases of epidemic encephalitis with 28 deaths, a case fatality of 13 per cent. so far. It is apparent that the incidence for this outbreak will reach at least 30 per one hundred thousand population. Some of the cases date back to the latter part of July for their onset. Cases of apparently the same inception have been reported from other cities in Missouri and neighboring States, but it is to be remembered that so-called epidemic or lethargic encephalitis, and encephalitis not otherwise designated, have a yearly incidence throughout the entire United States similar in magnitude to poliomyelitis as judged from mortality statistics, usually without the marked seasonal and yearly fluctuation of poliomyelitis.

"Cases of lethargic encephalitis occur yearly in St. Louis, the heaviest preceding incidence having been in 1919, 1924, and 1932. Relatively fewer epidemics of this disease have been reported in the United States than in other parts of the world, the disease in the United States being apparently sporadic or endemic. Such outbreaks as have occurred in this country have been, as is usual elsewhere, in winter or early spring. Preliminary data on age incidence show 19 per cent. of the cases among the 25 per cent. of the population which is under 15 years of age, with 10 per cent. case fatality in this age group. The incidence in this age group is about equally divided between those under and those over 10 years, and all 3 of the deaths in the group were in the former sub-division. Twenty-one per cent. of the cases have been in the age group 15 to 34 years, which comprise 35 per cent. of the total population, and there has been only 3 per cent. case fatality in this age group. Thirty per cent. of the cases have been among the 27 per cent. of the population which is 35 to 54 years old with 20 per cent. case fatality. Another 30 per cent. of the cases have been among those over 55 years old, who comprise only 13 per cent. of the population, and the case fatality in this oldest age group has been 30 per cent. In this respect also, as in seasonal occurrence, this outbreak differs from ordinary epidemic encephalitis, in which the maximum incidence tends to be in youth and the early adult years.

"There have been about 83 male cases to each 100 female, while among the total population concerned there are 96 males to each 100 females. The excess in females has been in the ages over 35 years. (*Turn to Page* 172)

ETHNOLOGY

Arabs Credit Elijah With Changing Melons to Stones

CHANGING melons to stones as a stroke of poetic justice against surly and stingy farmers is the miracle credited to the prophet Elijah by Palestinian Arabs to account for the round hollow boulders, some of them broken open to show the seed-like crystals lining their interiors, that litter the fields in the neighborhood of Mt. Carmel.

The legend of Elijah's melons has been dug out of the mass of native folklore by Dr. Ephraim Ha-Reubeni of the Hebrew University in Jerusalem. It relates that once when the prophet and his disciples were walking along the highway in the noonday heat, Elijah asked some farmers if they might not have a few of the melons with which their fields are filled.

"Those are not melons, they are stones," replied a surly farmer.

"Let it be as you have said!" responded the prophet.

And the melons have been stones to this day.

Science News Letter, September 9, 1933

BIOLOGY

Life Checks Downhill Course of Energy

LIVING matter distinguishes itself from non-living matter most fundamentally in its ability to check the downhill course of energy, from higher forms to lower, toward a final dead level when there will be no energy differential at all in the universe and hence nothing happening at all. Entropy is what scientists have called this downhill rush of energy. Life arrests entropy, dams up the course of energy and makes use of it for its own ends, while the non-living is passive and helpless before it.

With this essential difference between living and non-living, Sir Frederick Gowland Hopkins, president of the Royal Society, introduced his presi-

ELIJAH'S MELONS

A "melon" is shown in its natural imbedded position at the top of the picture. The size of these peculiar boulders is indicated by comparison with the matchbox in the lower left corner.

dential address on "Some Chemical Aspects of Life" before the annual meeting in Leicester of the British Association for the Advancement of Science, of which organization he is also president.

The principal dammer-up of cosmic energy used by living things is chlorophyll, the green coloring matter of common plants. The energy captured from the sun by leaves runs practically all living things on earth today. But the earliest living things, Sir Frederick said, were hardly as complicated as modern higher plants. More probably they built up supplies of energy as some free-living bacteria still do, by the capture and use of wholly inorganic substances such as sulfur, iron and ammonia. A little higher in the scale are bacteria with a purple pigment that enables them to capture sunlight energy for use in building up food-sources of energy.

Science News Letter, September 9, 1933

PSYCHOLOGY

Homesickness Preserves Family More Than Sex

THE INFLUENCE holding the family is more homesickness than it is sexual, Dr. Beardsley Ruml, of the University of Chicago, told the meeting of the American Psychological Association in Chicago this week. And this feeling has other very important effects on society.

Milder forms of homesickness, known to the psychologist as "nostalgic sentiments," have to do not only with the place thought of as home, but with persons, time, and even with abstract symbols.

"They are the foundation of patriotism, nationality," Dr. Ruml said. "They operate to increase vocational and class stability and tend to promote conservatism in all forms.

"Aesthetic sentiments are in large part nostalgic, as is the romantic attitude generally. The large part played by nostalgic sentiments in religious experience is evident."

The longing for home and the familiar is not confined to any particular culture. It is commonly observed among primitive peoples. Even animals are affected, as is the dog.

Failure to properly evaluate the importance of nostalgic sentiments has seriously hampered the social sciences, and their application to statesmanship and social control, Dr. Ruml concluded.

Science News Letter, September 9, 1933

BIOCHEMISTRY

Centrifugal Analysis of Blood Indicates Species Relations

Rate of Pigment Separation at 75,000 Rotation Per Minute Is Basis of New Method Developed by Swedish Biologist

USING centrifugal force some four hundred thousand times the force of gravity to study the relationship of animals is the latest achievement of Dr. Theodore Svedberg, of the University of Upsala, Sweden. In a lecture at the Woods Hole Marine Biological Laboratory, he described the application of this method to studies of blood of various animals.

The carriers of oxygen in the blood are colored substances called blood pigments. They are different in different animals, possessing differing molecular weights and structures. Therefore, if shaken up with a water solution they tend to fall to the bottom at different rates. To study these different rates at times short enough to be measurable it is necessary, however, to use forces that greatly exceed the force of gravity.

Dr. Svedberg has managed to produce this force by means of what is known as the ultra-centrifuge, a cell that holds the liquid to be tested, and is revolved at the terrific speed of 75,000 rotations per minute. To reduce friction it is necessary to have the entire rotating part of the apparatus in an atmosphere of pure nitrogen at a pressure about one-thirtieth that of the atmosphere.

It is as though an automobile were to keep turning a corner at a speed of about three hundred miles an hour.

Pictures are taken through crystalline quartz windows as the centrifuge revolves, and these pictures are then run through an instrument which measures exactly the density of the image, thus giving a more precise knowledge of where the blood pigment being tested was in the cell at the moment the picture was taken than is possible to the human eye.

From these studies it has been found that the blood pigments of some of the lower organisms are much more complex than man's, having molecular weights of the order of a million, as contrasted with the comparatively low one of 64,000 which is possessed by hemoglobin.

Dr. Svedberg suggests that the method may be used to tell different species apart in cases where the study of the form of the animal does not exactly place it in relation to the other animals of the same group.

Using a centrifuge that revolves at such high speeds is quite dangerous, for should some accident occur, the tremendous speed will result simply in an explosion.

"In the explosions we have experienced, the rotor has stayed inside the casing," Dr. Svedberg said.

This casing is made of special alloys, as are the other parts of the instrument, and is so constructed that the force of an explosion will be distributed partly to the foundation of the building.

Dr. Svedberg has carried back with him to Sweden for further study specimens of blood of several American marine animals, secured at the Oceanographic Research Laboratories, Woods Hole, Mass.

Science News Letter, September 9, 1933

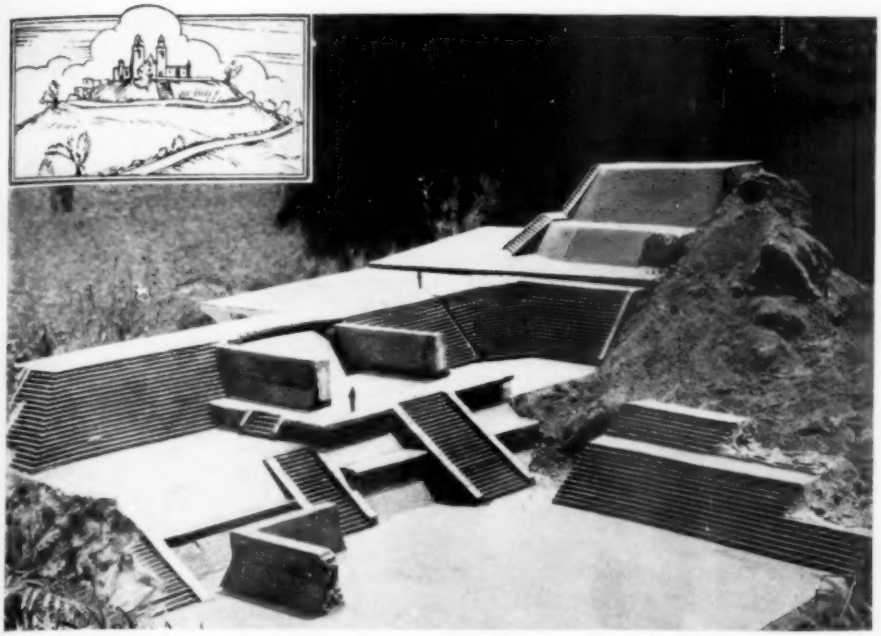
PALEONTOLOGY

Small Saber-Tooth Cat Found In Idaho Fossil Bed

A SABER-TOOTH cat species much smaller than the great tiger-sized animals made famous by the California tar-pit finds is represented by a jaw fragment from Idaho described in the current *Journal of Mammalogy* by Dr. C. Lewis Gazin of the U. S. National Museum. Another new species of extinct cat found in the same region resembles the modern puma or mountain lion.

These fossils were found among a mass of bones of extinct species of horses collected by paleontologists of the Museum. The stratum in which the find was made is of Pliocene age, perhaps two or three million years old, and dating before the coming of the great glaciers that once covered most of this continent.

Science News Letter, September 9, 1933



GREATER THAN EGYPT'S PYRAMIDS

METEOROLOGY

Twin Hurricanes Unique In American Weather History

UNPRECEDENTED in the weather history of this country, were Labor Day's twin hurricanes, that struck Florida and Texas simultaneously, C. L. Mitchell of the U. S. Weather Bureau informed Science Service.

"It has happened fairly frequently that we have had two hurricanes on the weather map at the same time," said Mr. Mitchell, "but this is the first time that I can recall when two actually 'made land' at the same time."

Although the Gulf hurricane that lashed the Texas coast from Corpus Christi to Brownsville was both "a big one and a bad one," in Mr. Mitchell's phrase, he did not anticipate the terrific damage and loss of life that followed the storm and tidal wave of 1900 at Galveston. The population in the path of the Texas storm is much smaller; moreover, the storm warning service is far better nowadays than it was on the Texas coast a generation ago.

The two storms started from the same general region, the South Atlantic in the neighborhood of the Cape Verde islands. One crossed the ocean, ravaged Cuba, and swept on over the Gulf of Mexico to the Texas coast. The second, following close upon its heels, visited its fury first upon the Bahamas and then struck southern Florida.

The present hurricane season, which has several more weeks to run, promises to come close to the record for number of such tropical terrors. Since 1886, the average number of hurricanes per year has been about seven, and the highest number on record is twelve or thirteen. Already this year there have been nine or ten storms of hurricane force, and there can easily be four or five more if they keep on coming at the present rate.

What causes hurricanes, and why some years are worse than others, are riddles which weathermen have not yet solved. However, a considerable boost has been given to hurricane research lately by the receipt of two meteorological radio dispatches a day from the breeding grounds of the hurricane family. When the belt of "doldrums"—Cape Verde islands, which are near the spotty tropical calms—shifts northward, hurricanes can be expected, Mr. Mitchell explained; and this year the doldrums shifted northward farther and earlier than usual, so that we have had a long and violent hurricane season.

Science News Letter, September 9, 1933

ARCHAEOLOGY

Tunneling Reveals Layers Of Mexican Pyramid

PESTERED by hostile Indians with rifles, and working underground like miners, Mexican archaeologists are at last discovering what Mexico's grandest old pyramid looked like. This pyramid at Cholula was bigger in volume than the famed pyramids of Egypt.

A Christian church (shown in inset) stands solidly at the top of the mound today, and the archaeologists can only find out what the ancient pyramid was like by tunneling cautiously under the church. To keep track of their progress, the archaeologists are making a plaster model of the wrecked and buried building. The photo shows how much of the hidden plan has so far been recovered. The two black figures suggest how tiny a human would feel at this site of ancient Indian worship.

So complex is the hidden maze of buildings that it is a hard problem in solid geometry to visualize them. The complexity is due to the fact that the Great Pyramid was enlarged several times, the Indians each time building a new layer over the old and using the old stairs and walls for foundation.

Local Indians have objected violently to tunneling at the site, feeling sure that the church on the hill was going to be dynamited. It required much diplomatic effort on the part of the archaeologists to persuade the natives to put up their rifles and to refrain from filling up the tunnels.

Science News Letter, September 9, 1933

ENGINEERING—LINGUISTICS

Linotype Machine Can Now Set Sanskrit

PRINTING in Sanskrit, the ancient language of India, can now be composed on the linotype machine. Hari G. Govil, a young Hindu scholar, has recently perfected the method with the collaboration of C. H. Griffith, of the Mergenthaler Linotype Co.

The alphabet used for printing Sanskrit is called Devanagari, and though it consists of only 49 separate elements, nearly 700 separate characters are used, often consisting of two or three pieces of type one above the other. But by means of the Govil-Griffith system, this can now be set on the standard 90-key linotype.

Science News Letter, September 9, 1933

ETHNOLOGY

Drinking Map of The World

Second Bone-Dry Era Is Ending in North America, For Indians Were Better Teetotalers Than Modern Whites

By DR. FRANK THONE

DRINKING fermented beverages is as widespread as civilization itself, and from all indications the practice is as old as civilization. Whether you regard it as a pleasant indulgence, or a moral weakness, or a degrading vice, all races of mankind above the most primitive have the habit. The empire of Bacchus is not world-wide, but it does include practically all lands where men have learned to raise grain in fields or trees in orchards, or to herd cattle and horses, camels and goats.

When you hear it said that all civilized men drink, you need not confine your mental picture to cocktail parties in skyscraper penthouses of Manhattan, or a *gemütlich* evening over the steins in München or Vienna, or elegant Japanese gentlemen sipping their little cups of saké. Much less pretentious civilizations than these have taken their pleasure in hunting for the bottom of the bottle. Your picture can include such modest claimants to culture as migratory tribesmen of the vast Asian plains, naked Indians of interior South America, Zulus of the South African veldt, and brown Malays of the East Indies. All these peoples, and many others in between, had their native tipples long before the white man brought them firewater, and most of them still stick to their old favorite brands of home brew.

Extensive Dry Areas

Yet the map of the world is not all wet. There are extensive areas that were dry before the adventurous European began his world-wide carer of trade and conquest, rather less than 500 years ago. In general, the "primitive fringe," the peoples who knew not agriculture or herding, were teetotalers before the white man handed them his dangerous flask. And in among the more civilized peoples in Africa and Asia there were little islands of savages—possibly fragments of almost-eliminated aboriginal populations—who were also strangers to fermented drinks.

And perhaps oddest of all, there was one extensive area where agriculture was practised, yet where the people had neither beer nor wine. That was the territory that is now the United States of America, now busily engaged in ending its *second* bone-dry era. There were a few wet spots in the country in the old Indian days, but they were not important. The anomaly stands: a native population civilized enough to raise corn and make clay pots, yet which had not learned to put the one in the other, pour on water and let nature take its course.

The brown-skinned Polynesians of the South Sea Islands, too, were apparently drys in pre-exploration days; though they have learned a trick or two since. Their agriculture, however, was much more happy-go-lucky than that of the Indians of our own corn-raising area, which took in practically all of the country east of the Great Plains and south of the Great Lakes area, including also what is now the Province of Ontario in Canada.

Drink and Grain

This interesting wet-and-dry map of the primitive world has been worked out by a leading anthropologist for serious scientific purposes, but it is none the less interesting to the rest of us, whichever way we may be voting on repeal. The data on the world's drinking habits at the beginning of the modern era were assembled from a multitude of sources by Dr. John M. Cooper, anthropologist of the Catholic University of America in Washington, D. C. He wanted to learn, among other things, how this drinking map of the world agreed or disagreed with one he had previously blocked out, showing the grain-raising, cattle-herding, "civilized" lands. The astonishing overlapping of the two areas, with the exceptions already noted, writes another interesting page in the story of the parallel development of separately originating civilizations.

For it is not to be thought that the arts of brewing beer and fermenting wine originated in one place and spread thence to all the rest of the world. More probably there were dozens of separate, largely chance, discoveries. Certainly chicha, the corn beer of the Mexican, Central American and South American Indians, must have had a separate birth from that of the barley and wheat beers of the Mediterranean basin and Europe, for anthropologists are now pretty well agreed that the inhabitants of North and South America came in by way of the Bering Straits region before agriculture was known to them, and invented the art independently of Old-World peoples when they found a suitable plant, the ancestor of our modern maize or corn, probably in Central America.

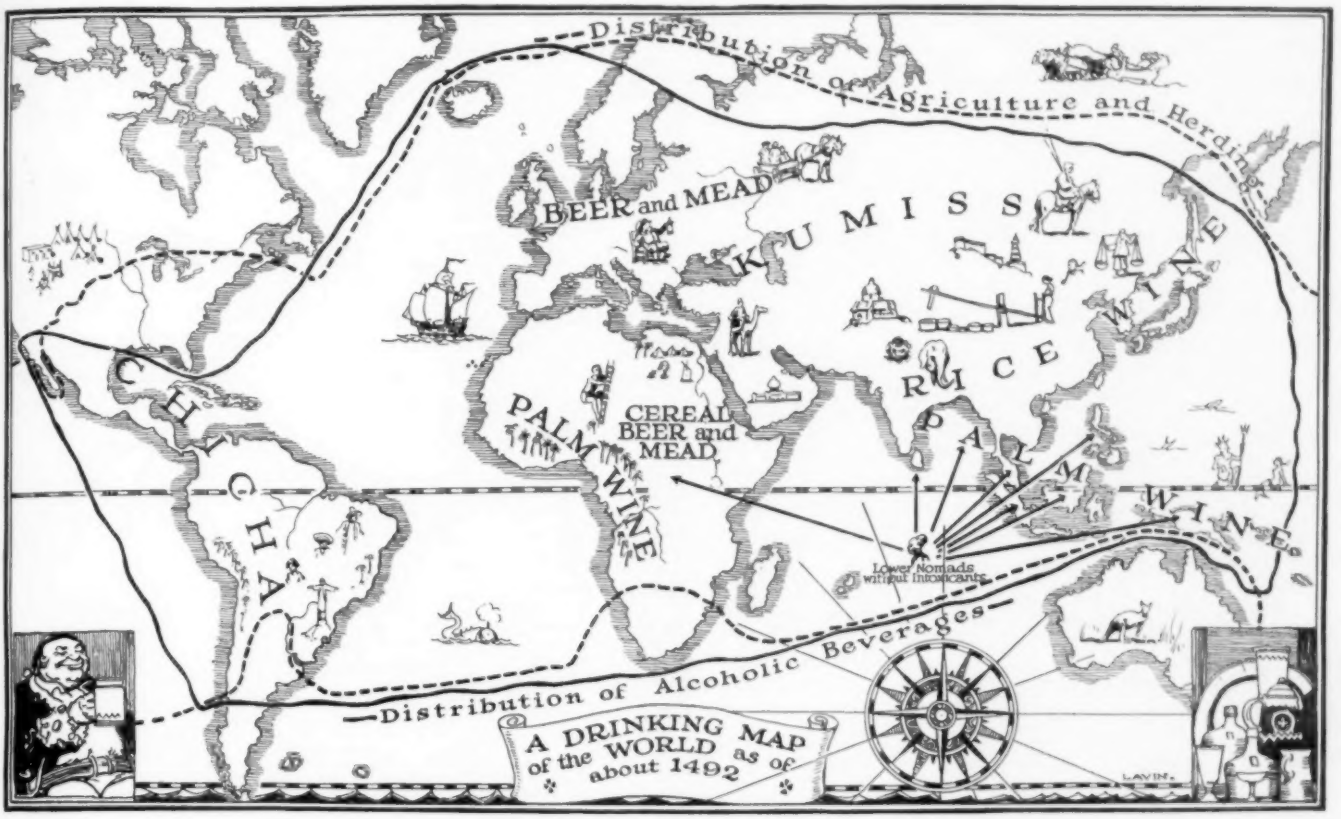
The native drinks produced in various parts of the world at the beginning of the modern epoch were many and various, but the ones most widely used number about seven.

Animal Origin

One of these, strangely enough, is of animal origin: kumiss. Kumiss is a drink made by the nomadic tribes of interior Asia from the fermented milk of mares and camels. Even the idea seems queer and unappetizing to our imaginations, but the dwellers in the felt tents like the stuff, and count among their most valued possessions the great jars in which they keep it and the cups from which they drink it.

The other six beverages are all of vegetable origin, and are enjoyed in the main by peoples of more strictly settled and agricultural habits. Naturally, each people learned to use the plants it raised or found abundantly in its own neighborhood. Thus we find the beer grains always identical with the bread grains: barley and wheat in the Egyptian-Asia Minor-European culture area, corn in America south of the Rio Grande, rice from India to Japan, millet in Central Africa. Thus also we find grape wine originating in and spreading from the native land of the wine-type grape, which is perhaps the hill country of Asia Minor. In northern Europe and central Africa, where there were plenty of wild bees in early times, men learned to dilute and then ferment their honey to make mead.

In the tropics, African, Indo-Asian and to some extent South American, the sugary sap of palm trees ferments quickly in the favoring heat into palm



wine. In India at least, some of the more primitive men do not trouble to collect the sap. They merely shin up a palm tree, cut out the central bud, leaving a cup-shaped depression, which quickly fills with the juice. Next day they shin up again, with a straw. Maybe they come down sober, maybe not. It is said that Ghandi includes prohibition in his hopes for a regenerated India. With arrangements as simple as this, it is hard to see how he will be able to make it work.

That about completes the list of the world's favorite drinks, as they stood before the restless white man began to mix them; kumiss, beer, wine, mead, rice wine, palm wine, chicha. And they are all older than history: there is no written record of the origin of any of them. On the contrary, in the lore of almost every people, some god or other is credited with their invention. Needless to say, that god is always a favorite. Roman youths swore by Bacchus, at least as often as they did by the successful politician Jupiter or the heavyweight champion Hercules. And the Mexican Indians credited the god of their chicha with bringing to his appreciative children on earth nineteen separate recipes for home brew on a single visit!

When the literature of a people credits a god with the beginnings of an art or an invention, it is a pretty certain sign of prehistoric origin. Either the wise king or clever priest who first put it across is given divine honors (as Imhotep, Egyptian designer of pyramids and pioneer physician, is said to survive in the Greek god Aesculapius), or else the legend is a way of dodging the humiliating admission: "We don't know."

Scores of Brews

Certain it is that the oldest written documents, both in Egypt and Babylonia, treat of brewing as an already universally established and highly elaborated art. Not even America in these days *post* April 7, 1933, can boast more brews than Babylon knew in her beeriest days. The Babylonians and their neighbors had literally scores of separately named kinds of beer, all duly listed as necessities for certain great temple feasts. And the Egyptians ran them close.

A curious feature in both Babylonian and Egyptian brewing was the use of bread, usually specially baked, as an ingredient. The loaves were broken up and thrown into the fermenting vat along with both malted and unmalted grain. This practice almost certainly indicates that brewing in the two countries had a common origin, though which learned from the other is not certainly determined. The same curious practice of fermenting liquor from soaked bread crusts still survives in parts of Russia and other Slavic countries, where a drink called "kvass" is made from soaked black rye bread.

Preparation of fermented drinks from the juice of grapes or other fruits, palm sap or diluted honey is of course an easy and natural thing. There are always yeast cells floating around in the air or clinging to the skins of fruits, ready to start any sugar solution they meet to "working." But to get a fermented product out of barley or rice or millet or corn, which consist mainly of starch, is a different matter. Yeast cannot work on starch; the starch must be converted into sugar first.

Malting is the time-honored process for accomplishing this end, in our own experience. This consists simply in wetting the grain, keeping it warm, and letting it sprout. When a seed sprouts, a ferment or enzyme able to convert its starch into sugar is released. Then if the sprouted grain is killed by heating (but not too hot) the ferment can be used to convert other starch into sugar as well.

Who discovered malting is just as much an unsolved (*Turn to Page* 172)

SEISMOLOGY

Earthquake Reported Five Days Before Cabled News

THE CHINESE earthquake that took 100 lives in Chengtu and vicinity and did considerable damage on Aug. 25 was located on the day of the disaster by Science Service's earthquake reporting service and reported immediately to newspapers served by Science Service and in SCIENCE NEWS LETTER for Sept. 2, p. 152.

In the Science Service determination, based on reports from seismological stations interpreted by the U. S. Coast and Geodetic Survey, it was definitely announced that "considerable damage and possible loss of life was inflicted upon the region of the city of Chengtu."

Not until five days later did delayed news of the earthquake come from the region itself.

This adds another to the series of earthquakes that have been located and bulletined to the world by Science Service hours, days or weeks before news emerges from stricken regions.

Science News Letter, September 9, 1933

ECOLOGY

Roots Are Bur Oak's Chief Weapons in Prairie Invasion

ROOTS, deep, spreading, exploiting the soil for every bit of available moisture, are the principal weapons employed by the hardy bur oaks that have been slowly invading the prairies of the West since the coming of civilization put an end to prairie fires. Before that time the prairies were the undisputed realm of grasses and other herbs, and even yet they give the invading oaks a hard battle in spite of the great disparity between the size of the contestants.

The development of bur oak roots in the prairie woodlands has been made the subject of a special study by Prof. J. E. Weaver of the University of Nebraska, who has reported his results to the *Botanical Gazette*.

The first thing an oak seedling does when it sprouts is get a long taproot down into the soil. It attends to this even before it unfolds its first leaves. By the end of the first season's growth this first taproot will have bored its way to a depth of from three to five feet, and will have many fine branches developed to soak up water.

When a prairie bur oak has reached its full growth, at from 50 to 65 years, it is 35 to 40 feet tall, 12 to 18 inches through at the base, and in pure stands of timber is from 10 to 40 feet from its nearest neighbors. Such a tree will have a massive taproot with thirty or more large main branches, most of which arise in the first two feet of soil. The taproot itself goes down to a depth of about fourteen feet.

The main branches of the root spread widely—more widely even than the branches of the top, some 50 to 60 feet—and then turn downward, some of them going even deeper than the taproot. Other branches grow upward, some of them even vertically. Still other roots are ropelike, running for many feet with diameters of from a half-inch down to a sixteenth of an inch. On this framework fine feeding rootlets are abundantly developed.

With so much of its growing energy concentrated on the root, the tree will have as much of its weight underground as in the air, and almost half of its volume also beneath the soil.

The secret of this powerful root development is to be sought in the water relations imposed on prairie plants by the prairie climate. The air is usually dry, and the wind blows much of the time, so that the leaves are constantly having water evaporated from them at a high rate. The water supply, on the other hand, is only moderate, though the character of the soil is usually such as to favor its long-time storage. To get enough water to meet the endless demands on the leaves, the roots are forced to a development probably never encountered in trees of "softer" climates of the East and South.

Science News Letter, September 9, 1933

CHEMISTRY

Vitamin C Synthesized By Swiss Chemist

VITAMIN C, the scurvy-preventing substance occurring naturally in oranges, lemons and many green vegetables, has been prepared synthetically by Dr. T. Reichstein of the Polytechnic Institute of Zürich, Switzerland. With his two collaborators, A Grüssner and R. Oppenauer, Dr. Reichstein announces in a communication to *Nature*, that they have succeeded in obtaining pure crystals of l-ascorbic acid, the highly active anti-scorbutic substance considered to be identical with vitamin C.

Science News Letter, September 9, 1933

IN SCIE

ASTRONOMY

Saturn Has New White Spot On Its Equator

A NEW white spot has been observed on the ringed planet, Saturn, near its equator, the Lowell Observatory at Flagstaff, Ariz., has notified the Harvard College Observatory at Cambridge, Mass. It was seen on the planet's central meridian at about midnight the night of August 28-29 and it was confirmed photographically.

The recent finding of the large spot and studies of it were described in SNL, Aug. 19, p. 115.

Science News Letter, September 9, 1933

VETERINARY MEDICINE

Caged Mammals and Birds Have Cancerous Growths

MANKIND is by no means alone in being subject to the affliction of tumors and other cancerous growths. A study of tumors occurring in animals of the Philadelphia Zoological Gardens has been reported to the *American Journal of Cancer* by Dr. Herbert L. Ratcliffe of the University of Pennsylvania. A review of more than 5,000 animal autopsy records shows the occurrence of these afflictions in about two per cent. of all the animals dying in the Zoo.

Mammals were much more frequently affected with tumorous growths than were birds, although there were more birds than mammals on record in the series of autopsies. Malignant growths were no respecters of zoological rank; they were found among the lowly opossums and other marsupials as well as among the dominating carnivores and the primates, closest of kin to man himself. Dr. Ratcliffe notes, however, that among all the orders of mammalia, the primates showed the lowest incidence of tumors.

The most common point of attack among mammals was the digestive tract; among birds the kidneys, adrenal glands and reproductive organs were most frequently involved.

Science News Letter, September 9, 1933

E FIELDS

PLANT PHYSIOLOGY

Cotton Seeds Helped By Acid Delinting

SOAKING cotton seeds in concentrated sulphuric acid for a few minutes removes the bothersome coat of lint that clings to them, abates the danger of infection by various plant diseases, and helps them to sprout earlier and grow faster. These and other benefits of acid treatment of cotton seeds are detailed in the *Botanical Gazette* by Miss Auval Hester Brown, graduate student of the University of Chicago.

Sulphuric acid soaking was used first to rid cotton seeds of bacterial and fungus diseases. The machine that was finally developed for the purpose is expensive, but is economically practicable for the farmers when it is used cooperatively.

Miss Brown's studies were aimed especially at the question of the effects of acid treatment on the germination and growth of the seeds. She found that it so encouraged early growth that earlier cultivation was made possible—a matter of considerable importance in keeping the crop a jump ahead of the boll weevil. She also found that acid-delinted seeds can be handled most advantageously by seed-planting machinery.

Science News Letter, September 9, 1933

PLANT PATHOLOGY

1936 To See Destruction Started in White Pine

"FOREST destruction as spectacular and ruthless as that caused by chestnut blight will begin in 1936 in the western pine forests of Idaho, Montana and Washington, except where white pine blister rust control is applied before that time."

With this prophecy of doom S. B. Detwiler of the U. S. Department of Agriculture opens a survey of the white pine situation in the official publication of the Society of American Foresters. The rust invasion has reached the epidemic stage through this region, he continues.

White pine blister rust is a fungus disease of the highly valuable white pine species, which first invaded this country in the eastern states some years ago. It spends an essential part of its life cycle on gooseberry and currant bushes, so that if these shrubs are all destroyed in a given region, the white pine growing in the area will be saved. Blister rust control based on this principle has been successful in the parts of the eastern white pine area where it has been applied; but general economic conditions have prevented extensive use of the method in the larger white pine areas of the West. Since the U. S. Government still owns about a third of all the western white pine now standing, a large responsibility rests with it.

Although the regular funds for the control of white pine blister rust, as provided heretofore through the Department of Agriculture, have been seriously curtailed through recent severe budgetary restrictions, it is expected that this loss will be more than offset by the use of the newly recruited "Forestry Army;" but this is an emergency measure only, and there is no definite long-time plan for carrying the fight into future years, which is indispensable if the western white pine forests are to be saved. Mr. Detwiler feels that this lack should be supplied at the earliest possible opportunity.

Science News Letter, September 9, 1933

VOLCANOLOGY

Steam Vent Breaks Through Oiled Road

A NEWLY-BORN steam vent is a novel wayside decoration to one of the highways in Lassen Volcanic National Park, in northern California.

Lassen Peak is the most recently active of the volcanoes of continental United States, not including Alaska, having been in eruption less than a score of years ago. The entire area of the park is volcanic in nature, with fantastic lava field, both ancient and modern, hot springs, mud volcanoes, boiling lakes, and steam vents, showing that the internal heat still is near the earth's surface.

Recently a small steam vent broke through the oiled surface of the Lassen Peak Loop Highway at a point where the road crosses the Sulphur Works, an area of gas and vapor vents and other volcanic displays. Fortunately the vent is at one side of the road and therefore not an impediment to travel.

Science News Letter, September 9, 1933

CHEMISTRY

Ammoniated Peat May Become New Fertilizer

COMMON peat, which exists by the billions of tons in ancient bogs in this country, promises to become an important factor in the fertilizer industry, if researches conducted by Dr. R. O. E. Davis and Walter Scholl of the U. S. Department of Agriculture result in a practical manufacturing process for what they call ammoniated peat.

The two chemists enclosed samples of peat in strong metal vessels along with ammonia synthesized out of the air, and subjected the mixtures to high pressures and a considerable range of temperatures. The result was a fertilizer containing a high percentage of available nitrogen, the most expensive of the elements used in fertilizers.

Science News Letter, September 9, 1933

PLANT PATHOLOGY

$200,000 Prize For Cocoa Disease Conqueror

"A PRIZE of $200,000 has been offered by the Government of Ecuador for an efficient method of stopping the monilia and witch's broom diseases that have destroyed 70 per cent. of our cocoa plantations," Dr. Eduardo Salazar Gomez, financial adviser to the Ecuador Legation in Washington and delegate at the World Economic Conference in London, informed a Science Service representative.

"It is true," added Dr. Gomez, "that as stated in a recent report of Science Service, certain new varieties of cocoa trees resist these diseases, but these varieties are inferior in flavor and other qualities to the original Ecuador cocoa, hence the Government is doing everything in its power to save original plants."

The diseases spread from Surinam (Dutch Guiana) to other plantations and all cocoa regions, including those of Brazil, Venezuela, and the Gold Coast of Africa are now involved. Considering, moreover, that the buyers and users of cocoa are equally interested in this matter which affects one of their common foods, the Ecuador Government is of the opinion that the whole question should form the subject of international consideration and has therefore brought it to the notice of the subcommittee of the Economic Conference dealing with plant-disease questions.

Science News Letter, September 9, 1933

RADIO

Magnetic Storms Trouble Radio, Survey Indicates

Height and Strength of Charged Layers 150 to 200 Miles Above Earth Intensively Studied From England and Norway

MAGNETIC storms surging around the polar cap of the earth are the cause of radio communication troubles. This fact is brought out by Drs. Edward V. Appleton, Wheatstone Professor of Physics at the University of London, R. Naismith and G. Builder in a communication sent to *Nature*, as the second International Polar Year ends.

Prof. Appleton and his co-workers have made an intensive survey of the height and strength of the electrically charged layers existing from 150 to 200 miles above the surface of the earth. Their apparatus could be called an electrical ladder that stretches up to these enormous heights, allowing them to determine exactly how these layers drift about and fade away from time to time.

Comparative measurements were made at Tromso, Norway, at the very northerly latitude of 69 degrees and in southeast England, 51 degrees north latitude. Radio waves of various wavelengths from 20 to 500 meters were shot vertically upwards to these layers. If the ionosphere layers are sufficiently strong the waves are reflected back to the earth and are picked up by the sending station. The time necessary for the waves to make the round trip, about one 500,000th of a second, allows the measurement of the height of the layer. The strength of the reflected signal tells the strength of the charge of the layer.

From the lower or F layer of the ionosphere, the English measurements showed the strongest signals from 8 p. m. on through the early part of the night. The Norwegian signals were strongly reflected about noon. But these were also the times that magnetic conditions were least disturbed.

When the magnetic conditions became greatly disturbed, a condition called a magnetic storm, the reflected signals vanished entirely. This means that the layers themselves became so weakly charged electrically that they were not able to reflect the radio signal.

Prof. Appleton has concluded that the electrical charging agency that produces magnetic storms influences the ionosphere. He states that this mechanism consists of both ultraviolet light and high speed material particles shooting into the upper regions of the earth's atmosphere. The particles appear to electrify the atmosphere in the region below the F or lower layer. The research thus suggests that these high speed particles are the most important cause of electrification of these high altitude layers whose shifting and disappearance has bothered scientists and radio engineers for many years.

Science News Letter, September 9, 1933

ENGINEERING

Waste Gas Analysis Tests Auto Efficiency

TESTING of car performance has become scientific by determining the amount of unburnt gas lost through the exhaust. An instrument that will enable a mechanic to make an accurate exhaust gas analysis that will allow prediction of combustion troubles was described by L. T. White of the Cities Service Oil Company before the Society of Automotive Engineers meeting in Chicago.

This electrical instrument is calibrated to read directly the motor's efficiency in burning up the mixture of gasoline and air drawn into the cylinders from the carbureter. Combustion efficiencies of between 75 and 80 per cent. are claimed to give the best performance and economy. If the meter of the instrument records an efficiency outside this range the mechanic is given a positive indication of the location of the trouble.

Better servicing is claimed when this power prover is used because the mechanics do not release a car until the proper efficiency is attained although it might seem to perform perfectly.

Improvement of combustion efficiency would decrease the amount of carbon monoxide emitted from the exhaust and so increase the quality of the air in a closed car.

HONEY-BAITED TRAP

Some plants, like the Venus' flytrap and the sundew, capture insects which become their food. Their mechanisms are so ingenious that it is difficult to refrain from calling them purposeful, as modern biophilosophers insist we must do. But there are others that trap insects by obvious inadvertence. Some milkweed flowers, for example, have their inner structure deeply and narrowly cleft, and insects slipping an incautious foot into one of these slits often find themselves unable to pull free again. This picture, by Cornelia Clarke, shows an unlucky nectar-sipping fly in such a predicament.

Gas from the exhaust is mixed with an excess of air and passed through a combustion chamber of the testing device to burn the waste fuel. An electrically heated platinum wire in the combustion chamber becomes hotter because of the heat released by the burning gas. The hotter the wire, the more resistance it offers to the flow of electricity through it. By measuring this resistance the operator obtains a measure of the heat released by burning the wasted fuel and so a measure of the efficiency of the engine in consuming a certain fuel mixture.

Science News Letter, September 9, 1933

The beautiful African antelopes known as bongos have vertical white stripes on their sides, and strangely enough these stripes are unequal in number on opposite sides.

ORNITHOLOGY

Blue Eagle, Though Flattened, Is Very Plainly an Eagle

JUST WHAT kind of a bird is the blue eagle of the NRA? A good deal of discussion has arisen over the ornithological position of this symbolic bird. It was hardly hatched before commentators, not all of them friendly, started to deny that it was an eagle at all. "Kind of a blue hawk," some of them said. A few would have it that the bird is a phenix. And disapprovers have labelled (or libelled) the bird as a buzzard.

One cannot safely indulged in a too-exact natural history study of an heraldic bird—and the "displayed" blue eagle of the NRA, spread out in an attitude impossible to a live bird without the aid of a steam roller, is first and foremost a creature of heraldry. Its taxonomic features must therefore be taken a bit liberally.

Allowing for this, the bird is plainly eagle. Its feather "trousers," extending clear out to its feet, are those of the golden eagle; the bald eagle's lower legs are bare. But that is no sin against the letter of American heraldry, for when our national bird was chosen Congress merely specified "the Eagle," without mentioning the bald eagle, although that bird, being exclusively American while the golden eagle is known also in Europe, would really seem to have the better claim.

The beak is distinctly of an eagle, aquiline. There is a moderately long basal portion, which bends abruptly over into a sharp, cutting, down-pointed tip. Hawks' beaks round over directly from the base, and are thereby shorter-appearing than the eagle's beak.

A buzzard the bird certainly is not. Buzzards do not have sharply bent-over tips on their beaks. Carrion-eaters, their cutting and tearing implement does not need to be as strong as those of eagles and hawks, which are predominantly eaters of clean, fresh meat.

Of course, neither eagle, hawk nor buzzard has feet like the NRA bird, with only three toes. They all have four-toed feet, three toes directly forward and one backward. But designers of emblems, like poets, must be allowed a certain range of license.

Supporters of the claims of the phenix have two things in their favor. Since the phenix was a totally legendary bird anway, it could look like anything the artist chose to make it look like; so shape of beak and number of toes do not especially matter. The color of the bird also favors the phenix, for it was by tradition "purple and gold of plumage"; and blue is a fair approximation of that, while nobody ever saw a blue eagle, a blue hawk or a blue buzzard.

Against the phenix one must count the absence of flames. The phenix of heraldry, both medieval and modern, is always shown rising from the bath of fire that consumes it and at the same time renews its youth. And it would do no good to claim the lightning in the NRA bird's left claw as flames: even the men of the middle ages, who didn't know what lightning was, plainly distinguished it from ordinary fire.

All things considered, therefore, the careful student of ornithology would probably have to give his verdict in favor of the eagle as the real parent of the NRA bird.

Science News Letter, September 9, 1933

METALLURGY

Gas Defends Metals Against Corrosion Losses

HYDROGEN, the lightest gas known to man, is the sole defender against the ravages of corrosion. That hydrogen was the limiting factor in preventing wholesale corrosion of metals exposed to dampness was the opinion expressed by Prof. Oliver P. Watts of the University of Wisconsin, before the Electrochemical Society.

The slow but certain eating away of water pipes and minerals by salt and acid waters is adding an enormous amount to the cost of modern civilization. Engineers are studying the theories of corrosion because it is only through a more complete understanding of the fundamental process that they will be able to diminish this loss.

Thirty years ago Dr. R. W. Whitney, now vice-president of the General Electric Company, announced that the corrosion of metals was an electrochemical process and this view is generally accepted today. When a metal is in contact with an acid solution corrosion takes place by the chemical process of the metal replacing the hydrogen in the acid. The acid dissolves the metal and hydrogen is released.

This released hydrogen coats the metal surface with an electrically charged layer that prevents the chemical reaction from continuing at the initial rate. If the hydrogen layer is built up to a sufficient thickness the reaction is practically stopped. However, under natural conditions, the hydrogen combines with the oxygen of the air to form water and the dissolving of the metal goes, limited by the amount of oxygen available to remove the protective coat of hydrogen.

Impure metals are corroded more quickly than pure metals. Electrochemists believe that this is due to the impurities taking up the hydrogen. Contrary to the popular belief pure metals are subject to corrosion under the action of certain acid solutions. Prof. Watts has shown that if oxygen is absolutely excluded copper will not corrode in a solution of sulfuric acid, a reaction that is very rapid in the open.

Science News Letter, September 9, 1933

A thrilling journey into the future of science

THE UNIVERSE ★ *of* LIGHT ★

by Sir Wm. Bragg

England's noted physicist surveys the progress made and to be expected in the study of radiation.

"One of the important books of this year"—*N.Y. Her.-Trib.*

MACMILLAN $3.50

From Page 163

"The symptomatology of the cases has differed somewhat from most other outbreaks of epidemic encephalitis in that disturbances of the motor functions of the eye are unusual, instead of being usual, and there is a more uniform and moderate meningeal involvement, with corresponding increase in the cell count on spinal puncture. The clinical picture is that of a general febrile disturbance, often with gastro-intestinal symptoms such as vomiting, constipation, or diarrhea; evidences of cerebral involvement—an apathetic or immobile facial expression, usually somnolence, stupor, coma or delirium;—usually a moderately stiff neck, with headache, which is often the first and most pronounced symptom, and other pains, as of the abdomen or legs; tremor and catatonic semi-rigidity are common in the more severe cases. Tendon reflexes, such as those of the elbow, knee, ankle, and superficial reflexes such as those elicited by stroking the abdomen tend to be irregularly diminished or absent, and to vary from day to day. Not infrequently the plantar reflex is extensor, the toes coming up on stroking the outer side of the sole instead of bending down. There may or may not be a Kernig sign. Some patients are very restless and have to be restrained. Irregular paralyses may occur, and hemoplegia, usually transient, is not uncommon."

More Workers

Four research workers from the U. S. Army Medical Corps have joined the scientists of the U. S. Public Health Service in the St. Louis encephalitis area. They are: Maj. James S. Simmons, Maj. Virgil H. Cornell, Sgt. George F. Luitpold and Sgt. Jesse F. Rhoads.

These four men have had long experience in the study of insect-borne diseases, and will concentrate their attack on the question of the possibility that the present outbreak of encephalitis is being carried by mosquitoes or other insects.

Science News Letter, September 9, 1933

From Page 167

riddle as the whole discovery of the brewing art itself. However, it is a relatively complicated process, and not all the makers of beer in the primitive world knew about it. The others had another way of changing their starchy grains into sugar.

You will doubtless remember that your physiology teacher, back in school, told you that if you chewed a piece of soda cracker long enough it would begin to taste sweet. Perhaps you tried the trick, and found that it worked.

That is the other way of changing starch into sugar: by means of the ferment or enzyme found in human saliva. And that is the way around the malting problem used by many of the brewers of the world outside the Egyptian-European area. The same technique was used and still is used in the preparation of the saké of Japan and the other Asian rice wines, the chicha of tropical America and the millet beer of central Africa. The women chew at least a part of the grain and then spit it into the fermenting-jars. It sounds messy to us; but it works, and the drinkers of those countries don't mind it. It all depends on what you're used to.

Fermented drinks constituted the "wine card" of almost all peoples at the beginning of the modern era, which Dr. Cooper reckons as of about the date of Columbus' first voyage. At that time very few peoples knew anything about distillation and the preparation of the strong liquors that have constituted the real crux of the "drink problem" in our own day. Even in Europe, where distillation has reached its maximum, strongly alcoholic beverages were still as good as unknown a century after Columbus. We think of Falstaff as a classic souse, yet he did his toping on wine. There was no whiskey, no brandy, no rum, no cognac, on the long bill he cursed so heartily over.

But not long afterwards, in the days of the Stuart Kings, men were getting drunk on stuff they called "aqua vitae"—a name still surviving in the French *eau de vie* and the Swedish *akvavit*. The same misnamed "water of life" is said to be the basis of the somewhat corrupted Erse word "whisky."

How distillation got to Europe, even as modernly as it did, nobody knows for certain. The art is credited to the Arab alchemists of the later middle ages.

The name *alcohol* is of course Arabic, but it meant originally the fine black powder with which the ladies of the harem darkened their eyelashes, not the liquid used by unbelievers as a foundation for blacking whole eyes. Only by derivation has it been transferred to the limpid but dangerous fluid now too well known to the western world.

But it is unlikely that the Arabs invented distillation. They really invented very little of their own, even in their palmiest days, though they were always very apt pupils of other and older cultures. Much of their alchemy seems to have come from China, and Dr. Cooper believes he has found evidence that the Chinese alchemists knew how to make strong distilled liquors centuries before the art found its way to the Occident.

Science News Letter, September 9, 1933

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Front Cover Picture

The laboratory has yielded a photograph of striking beauty showing Dr. Joseph Slepian and Leon R. Ludwig, Westinghouse engineers, examining a product of their research.

They have developed a new method of controlling mercury arc devices which is said to be more positive and many times faster in action than methods now used. The arc can be started 60 times a second at any point on the voltage wave, and, since there is no grid to be protected from heating but merely a carborundum-pencil dipping in the mercury pool, large currents can be controlled as easily as small ones.

ARCHAEOLOGY

Town Planning Before Babylon Shown by Finds Near Baghdad

THE EARLIEST known example of town planning has been discovered at Kafaje, an archaeological site in Iraq about 50 miles from Baghdad—east of the river Tigris. Writing in the *London Times*, Dr. H. Frankfort, field director of an expedition working on behalf of the Oriental Institute of Chicago, reports that he has uncovered a temple, contemporary with the tombs discovered by C. L. Woolley at Ur and dated at about 3500 B. C. A part of the town in which the houses are arranged with the greatest regard to economy of space was also unearthed. The partition walls are shared by adjoining houses and blind alleys serve as the entrance to houses at their ends. The houses are square with one another, and one long street runs through the town from northwest to southeast with side streets running off it at right angles.

Much of the site was pillaged by robbers in 1928, but one valuable find which they missed is a sculptor's workshop. Here can still be seen the details of the sculptor's technique. Statues are here in various stages of being hewn out of square blocks, while unfinished parts show how the sculptor dealt with broken statues sent to him for repair.

At Tell Asmar, 15 miles away, where the expedition has also been at work, several discoveries of the first importance for archaeology and the history of religion have been made.

For the first time archaeologists have been able to examine the domestic arrangements of the time of King Sargon I, the great king who founded the dynasty of Babylon in 2750 B. C. and claimed to have extended his dominions as far as the Mediterranean. Dr. Frankfort's expedition has excavated a temple and houses of this period, the first available for examination.

In the large "palace" building, what was apparently the women's quarters, a unit of longer rooms with small rooms grouped around, was found. This was not accessible from outside. It was strewn with pots, handmills and domestic utensils. In a small suite of two rooms, probably the apartments of the mistress, were beads, an ivory comb, rouge and black kohl for the eyes, both kept in mussel shells, and finally what Dr. Frankfort regards as the raw material for the equivalent of the modern European lady's embroidery, lumps of bitumen and pieces of mother of pearl for inlay work.

Equally important for the student of early religions were the carved reliefs which were found in a temple of an earlier date than the Sargonic buildings, the "House of Abu," the Lord of Vegetation. In several of these reliefs the god is shown with part of his body in the form of a snake. In another a human or divine figure attacks a seven-headed monster with a spear. Four of the heads hang down while the remaining three menace the figure. This, Dr. Frankfort says, is undoubtedly the Asiatic prototype of the combat between Hercules and the Hydra.

Most important of all, however, is what Dr. Frankfort regards as a representation of the central mystery of the Asiatic fertility cults—the marriage of the god and the goddess. A male and female deity are shown side by side on a bed with the priest at the foot. This incident is hinted at in Babylonian texts; but this is the first representation of it ever to be found.

Science News Letter, September 9, 1933

ZOOLOGY

Petrified Forest May Show Antelope Herds of America

PETRIFIED Forest National Monument, in eastern Arizona, one day may be the great show place for antelope in this country, if plans now being considered by the Office of National Parks, Buildings, and Reservations of the Department of the Interior are carried out.

The Petrified Forest is a natural range for these plains animals. At present about 38 antelope range immediately south of the monument and along the approach road, while another band of 30 ranges immediately southeast of the monument and still a third, numbering about 200, ranges to the west. With this nucleus in the vicinity of the monument, there is sufficient stock available for further development.

George M. Wright and Ben H. Thompson of the Division of Wild Life Studies of the Office of National Parks, Buildings, and Reservations, after inspecting the Petrified Forest last summer, recommended that the development of the monument as a real antelope preserve be inaugurated this summer. The plan under discussion involves fencing the outer boundaries of that portion of the monument under consideration for restocking, to keep out stray cattle and give the natural forage an opportunity to return.

Science News Letter, September 9, 1933

VETERINARY MEDICINE

Mosquitoes Carry Sleeping Sickness To Horses

SUSPICION that insects, possibly mosquitoes, may be carriers of the sleeping sickness outbreak in the St. Louis area receives a certain degree of indirect support in the recently established proof that a disease of the same general type in horses is transmitted by the yellow-fever mosquito, *Aedes egypti*.

Encephalomyelitis of horses, which produces in horses and mules symptoms more or less resembling those of sleeping sickness in man, was traced to a filterable virus as a causative agent within the past four years, by Prof. K. F. Meyer of the Hooper Foundation and associates of the University of California. Early in the spring of this year, Maj. R. A. Kelser of the U. S. Army Medical School succeeded in infecting a horse through the bite of a yellow-fever mosquito known to be a carrier of the virus. He demonstrated also that the insect was not a mere mechanical

▼ RADIO ▲

THE POETRY OF THE ROCKS

an address by

Dr. R. S. Bassler

Curator of Geology at the U. S. National Museum, Washington

To be given Friday, Sept. 15 at 1:45 p. m. Eastern Standard Time over stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

carrier, but that the virus underwent some change in its body, analogous to the changes undergone by the malaria germ in the body of its carrier mosquito.

While this is not necessarily to be taken as indicative of a mosquito transmission of the present type of human encephalitis, it is at least suggestive.

The U. S. Public Health Service is not overlooking the possibility of insect transmission of the disease. A medical entomologist has been added to the corps of research workers now in the St. Louis area, and he is keeping in touch with the Washington office of the Service by long distance telephone.

An early killing frost followed by a sudden drop in the development of new cases would be a strong link in the chain of evidence binding the guilt on an insect carrier. But the average date for the first killing frost in St. Louis, over a 59-year period, is October 29; and that is too long to wait, if even fairly good evidence develops that mosquitoes are the carriers. The health authorities are prepared to wipe out all mosquitoes in the St. Louis area within two weeks, in case such evidence should justify the expense of the experiment.

Science News Letter, September 9, 1933

The History of Staining

A series of papers on the History of Staining which has been appearing in Stain Technology from 1928 to 1933 is to be published in book form about October 1, 1933. This book also includes full-page portraits and biographical sketches of nine men prominent in the development of staining technic.

The price of the book is to be $2.00, but a special pre-publication price of $1.50 is offered until the fifteenth of October, provided orders are accompanied by cash or by official orders from educational or scientific institutions.

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PHYSICS

History Never Repeats Self Mechanical Analogy Argues

IN DREAMS we sometimes find ourselves repeating experiences over and over. The scientists are discussing whether or not the universe is like that, capable of repeating over and over.

It is argued that time is infinite and that the total number of different kinds of events is finite, though large, since the whole volume occupied by matter is finite and the numbers of protons, electrons and photons are finite. Therefore every possible combination of events, however improbable, must occur over and over again. History in the large is like the repeating pattern of a wallpaper.

Prof. J. B. S. Haldane, the British biologist, has recently upheld this idea in opposition to Sir James Jeans' suggestion that the whole material universe is running down, that it must have been wound up at some finite past time and must cease to run down at some finite future time.

Prof. A. S. Eve, the McGill University physicist, says that the idea of history repeating itself is only a bogey. He produces argument that may relieve us of the necessity of believing that in an infinite past duration of time, these words have been written before, you have read them, not once, but again and again in the past, by the same light that falls upon the previously printed paper actually manufactured as before from the same material, woven atom by atom in the same pattern, printed in the same number of this magazine, dated identically day, month, year and entirely indistinguishable from the present number, all the rest of the universe being in the same state as before. And that in an infinite future time all these things must happen not once, but over and over again, without limit.

Prof. Eve's Argument

Here is Prof. Eve's argument:

"Consider a simple universe consisting only of two infinitesimal particles or points, one swinging to-and-fro along a diameter, the other going round the circumference of a circle. If these points start together on their different paths from the same end of a diameter and move as stated with equal and unvarying speeds, then since the circumference and diameter are incommensurable, and their ratio pi = 3.14159 . . . never repeats or terminates even in an infinity of figures, it follows that the two points will never meet again at their original starting point. Incommensurables such as the square root of 2,3, etc., are also common enough in our pattern of Nature so that it is safe to reject the idea of recurrent cycles and to state definitely that history does not and can not repeat itself. So that creation, new things for old, is proceeding to its fullest extent now.

"If it is urged that the above argument about two ideal infinitesimal particles racing round a circle and to and fro along a diameter (none of such things existing) is too academic and abstruse, it may be stated that if there is no limit to the smallness of a displacement, then any three bodies may occupy an infinitude of relative positions, which will not necessarily recur in an infinity of time. If the height of a wave is capable of all values, then the pattern of the waves on a lake or ocean will never repeat. Radiation in the universe, even in infinite time, is certainly yet more unlikely to recapture a previous state, even ignoring the tendency to 'run down' or change from short to longer waves."

Science News Letter, September 9, 1933

MEDICINE

Vitamin C Lack Connected With Cataract of Eye

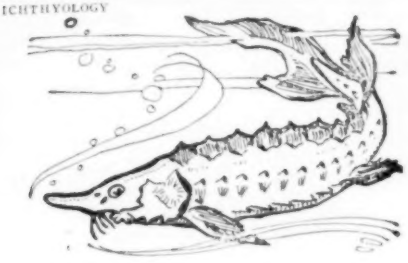
LACK of vitamin C, the scurvy-preventing principle, may have something to do with the occurrence of cataract of the eye, in the opinion of Prof. H. K. Müller of the eye clinic of the University of Basel, Switzerland.

Rabbits to which Prof. Müller fed doses of naphthalene, the smelly stuff mothballs are made of, developed cataracts. At the same time, the vitamin C which is usually present in the aqueous humor of the eye disappeared. Prof. Müller has reported his discovery to *Nature*.

Science News Letter, September 9, 1933

NATURE RAMBLINGS
by Frank Thone

ICHTHYOLOGY



Sturgeon

THE sturgeon is a freshwater fish, but you will find him only in goodsized lakes and in big rivers, for he is a big fish and needs room for the proper expression of his style. He will furnish the ambitious fisherman with a fine fight; but as for eating afterwards, that's a matter of taste. Some like him and some don't. But the roe of Mrs. Sturgeon becomes caviar, which you are supposed to like, even if you don't, or have never tasted it.

Looked at with a curious eye, the sturgeon has much about him that reminds one of a shark. Arrangement of fins, shape of tail, general outline of body, mouth on underside of pointed, shovel-shaped-snout—there is something decidedly and uncomfortably reminiscent about the whole business. Also, his fierceness and his voracious appetite, and his vicious behavior when hooked, all recall memories of sharkiness.

There is some right and reason in this. The sturgeon belongs to a primitive order of fishes, the ganoids. These were the fishes that in the remote ages before the coal beds were formed populated the seas with armor-plated monsters—veritable living submarine battleships. The rows of heavy scales along the sturgeon's back are relics of that time. These earliest of true bony fishes (for sharks have no true bones, only cartilages) were the monarchs of their time, but a newer race has crowded them out, so that only a few odd genera of the ganoids have lived through, and of these the only one worthy of recognition of a knight and a gentleman is the sturgeon.

Science News Letter, September 9, 1933

A shrimp spawns once in its life but may produce 800,000 eggs.

ENGINEERING

British Engineer Criticizes Development of American Car

THE QUESTION that bothers most prospective car purchasers is how they can tell the differences between and the advantages of the many almost identical automobiles in the medium price class. American manufacturers have lost sight of some of the important foreign automotive engineering developments and are proceeding along a narrow path of specialized improvement in detail, is the opinion of the British engineer, L. H. Pomeroy, Managing Director of the Daimler Company that produces the Baby Austin cars in England. Mr. Pomeroy talked before the Society of Automotive Engineers at Chicago.

The English criticisms of the American car range from too rapid depreciation caused by big horsepower to the opinion that the windows are too high. Although they grant that "one man's meat is another man's poison," some of their suggestions are worth considering.

Too Powerful

The premier contention is that the size of the engine has been developed out of all proportion to the requirements of rational performance. High speeds and high acceleration have been overemphasized and the comfort, spaciousness and luxury of the body have not kept pace with the stupendous power performance. Perhaps this has been due to the ease with which publicity departments can impress the public with spectacular figures.

English engineers feel that American designers have not taken advantage of the possibilities of considering the gear box as part of the engine. They feel that the motorist will secure as much enjoyment at less cost from driving with a lower powered car even if it is necessary to shift the gears more often.

The use of light alloys of aluminum and other metals that has become so common in European cars has been almost entirely neglected in this country. A light weight car means that the engine power can be cut down and the economy of operation increased. The saving of as much as 50 per cent. in some of the heavy steel parts, such as axles, will entail an additional expense but past experience has shown that the consumer has always been willing to pay for a genuine improvement.

Engineering developments in Europe that are not attracting the attention that they should are methods of gear shifting, automatic variable-speed transmissions, fluid flywheels and supercharging.

British manufacturers are wondering if the American car is to hitch its wagon to the star of top-gear performance forever in spite of engineering developments which make this wasteful and unnecessary.

Science News Letter, September 9, 1933

ARCHAEOLOGY

Most Enticing Mounds To Be Opened in Fall

THE GREAT "South Terrace," perhaps the most enticing part of the acropolis of Monte Alban, because under its ancient hood of earth and vegetation it appears to be the best preserved part of the ancient city, will be the goal of the Mexican Monte Alban expedition headed by Dr. Alfonso Caso this autumn.

The acropolis is a tableland on top of the Alban Mountain. It is about a third of a mile long, lying roughly north and south. The "North Platform," which cuts the tableland off on the north, was excavated last year, as was the Dancer's Temple on the west, and (*Turn Page*)

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a group of three connected pyramids in the middle. The South Platform, superior to any of these other structures in ancient remains, to judge by its contours revealed under its earth covering, is still untouched. It looms even higher than the North Platform did, and looks down on the whole acropolis. It has mounds on top, and there are mounds upon those mounds, so that Monte Alban's highest point is there. On the sides it looks straight down into the Valley of Oaxaca, 1,300 feet below.

On the southeast corner of this South Terrace is a mound with a hollow rotunda inside, ruined, but still preserving its shape. It had a chimney-like opening in the roof, and corridors on the ground floor going into the four world directions.

Mrs. Zelia Nuttall, the eminent archaeologist long resident in Mexico, who recently died, called this an astronomical observatory, and the most important ancient building in America because she saw in it the link of all the calendar-cultures of America. This building will be included in a thorough excavation of the South Terrace.

In fact, Dr. Caso deliberately saved the South Terrace because of its apparent importance, believing that excavating experience in other parts, first, would be of service here. The Mexican archaeologists will also continue excavations in the big graveyard area where treasure was found in 1932, and where twenty-six other tombs were found this past season.

Science News Letter, September 9, 1933

PREPARE for Fall Reading

The latest books are promptly reviewed in Science News Letter. Consult "First Glances" of recent numbers, make a list of your wants and send it to us. They will be given our immediate attention.

First Glances at New Books

Geography

THE MAKING OF GEOGRAPHY—R. E. Dickinson and O. J. R. Howarth—*Oxford Univ. Press,* 264 p., $3. Tells of the brave, groping efforts of travelers and navigators to find out what this earth is like. With its first picture, a Sumerian map of the world drawn 2700 B. C., and its last picture, a map dividing the world into natural regions according to very modern geographic principles, this history of geographic science is a good post-graduate course in geography for the fire-side, as well as a good reference work.

Science News Letter, September 9, 1933

Biology-Philosophy

THE UNIVERSE AND LIFE—H. S. Jennings—*Yale Univ. Press,* 94 p., $1.50. The Terry lectures at Yale as delivered by the Henry Walters Professor of Zoology at the Johns Hopkins University. Prof. Jennings discussed the nature and potentialities of the universe as revealed by the study of biology, the production of new and unpredictable phenomena as time passes, the nature of evolutionary progress and the management of life.

Science News Letter, September 9, 1933

Textile Technology—Physics

FUNDAMENTALS OF FIBRE STRUCTURE— W. T. Astbury—*Oxford Univ. Press,* 187 p., $3. X-rays have had many applications to the analysis of structure of materials and their service in understanding fibers is one of the most important. The author, who is director of the Textile Physics Research Laboratory of the University of Leeds, brings into book form six lectures given to textile students and operatives, discussing the fundamental nature of matter and radiation, the invisible fibers of the world of molecules, how atoms and molecules make patterns in space, the inside of a textile fiber, and difference between wool and other fibers. Sir William Bragg in the introduction says: "The fibre is an essential constituent of all things that grow; and man has made wide use of its qualities in many ways. Spinning and weaving have been one of his chief industries since prehistoric times. With wool and silk, cotton and jute, and many other kinds of fibre he has clothed himself and furnished his house; he has made ropes and sails; he has manufactured paper and felt, artificial silk, and hundreds of other things in everyday use. The X-ray methods show that fibres are crystalline in the sense that they contain innumerable small bodies, the atoms and molecules of which are in regular array. The properties of the fibre depend largely on the size and disposition of these minute crystals as well as on the arrangement of atoms and molecules within each crystal. The X-rays not only reveal the existence of crystalline structure: they determine also its design."

Science News Letter, September 9, 1933

Botany

THREE KEYS TO WILD FLOWERING PLANTS—Mary Franklin Barrett—*Author, 64 Park Avenue, Bloomfield, N. J.,* 46 p., 50c. Artificial keys to (1) submerged and surface-floating aquatics, (2) autumn-flowering moncotyledons, (3) autumn-flowering composites of Connecticut, southeastern New York, New Jersey and eastern Pennsylvania. This should prove a useful addition to the encouragingly growing local-flora literature.

Science News Letter, September 9, 1933

Library Science

NEWSPAPER REFERENCE METHODS —Robert W. Desmond—*Univ. of Minnesota,* 229 p., $2.50. More than half of this book deals with the organization, administration and routine of newspaper libraries; and this material is a mine of valuable and useful information. The book lists at the end of the volume have not been brought up to date.

Science News Letter, September 9, 1933

Biography

FIFTY YEARS OF MUSEUM WORK: Autobiography, Unpublished Papers, and Bibliography—Frederic A. Lucas—*Am. Mus. Nat. Hist.,* 81 p., 5 pl., $1. A veteran museologist and zoologist gives a good account of his stewardship.

Science News Letter, September 9, 1933

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